

WHAT IS CLAIMED IS:

1. A method of imbedding a hidden digital watermark into a produced image comprising the steps of:

5 repeatedly extending the digital watermark in a symmetric form and adjusting the extended digital watermark in the same size as an image into which the digital watermark is embedded;

decomposing the digital watermark image and the image into which the digital watermark is embedded into subbands;

10 properly adjusting pixel values of the subband-decomposed digital watermark image in accordance with the subband-decomposed image into which the digital watermark is embedded, and adding the pixel values of the subband-decomposed digital watermark image to pixel values of the subband-decomposed image  
15 into which the digital watermark is embedded; and

producing a final image into which the digital watermark is embedded by a subband synthesis.

2. The method as claimed in claim 1, wherein the step of  
20 repeatedly extending the digital watermark in the symmetric form repeatedly uses an extension of the digital watermark in right and downward directions, respectively, repeats the extension of the digital watermark until the extended digital watermark image becomes larger than the image into which the  
25 digital watermark is embedded, and adjusts the extended digital

watermark image in the same size as that of the image into which the digital watermark is embedded by cutting off portions of the digital watermark image that exceed the size of the image into which the digital watermark is embedded.

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3. The method as claimed in claim 1, wherein the step of decomposing the digital watermark image and the image into which the digital watermark is embedded into subbands performs a horizontal subband-decomposition the number of which corresponds to a multiplier of 2 and a vertical subband-decomposition the number of which corresponds to another multiplier of 2 by decomposing the images into 2 subbands in the horizontal and vertical directions, respectively, and then decomposing the decomposed subbands again in the same manner in the horizontal and vertical directions, respectively.

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4. The method as claimed in claim 3, wherein the decomposing step is implemented by a low-pass filter and a high-pass filter for filtering one-dimensional signals in the horizontal and vertical directions.

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5. The method as claimed in claim 1, wherein the step of adding the pixel values of the subband-decomposed digital watermark image to the pixel values of the subband-decomposed image into which the digital watermark is embedded is performed

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in a manner that the digital watermark image and the image into which the watermark is embedded are added at different rates in three different regions composed of an edge region, homogeneous region, and texture region of the image in consideration of a biological research result of a human visual system model in that human eyes react on the image with different sensibilities in the three regions.

6. The method as claimed in claim 1, wherein The step of producing the final image into which the digital watermark is embedded performs the subband synthesis in the reverse order of the step of decomposing the digital watermark image and the image into which the digital watermark is embedded into subbands.

7. A method of embedding a hidden digital watermark into a produced image comprising the step of embedding the digital watermark in accordance with color types of the digital watermark image and the image into which the watermark image is embedded.

8. The method as claimed in claim 7, wherein in case that the digital watermark image is black and white, and the image into which the watermark is embedded is black and white, the method as defined in claim 1 is used as it is.

9. The method as claimed in claim 7, wherein in case that the digital watermark image is black and white, and the image into which the watermark is embedded is color, the image into which the watermark is embedded is converted into a YUV form, and the digital watermark is embedded into a Y component.

10. The method as claimed in claim 7, wherein in case that the digital watermark image is color, and the image into which the watermark is embedded is black and white, the digital watermark image is converted into a YUV form, and a Y component of the digital watermark is embedded into the image into which the watermark is embedded.

11. The method as claimed in claim 7, wherein in case that the digital watermark image is color, and the image into which the watermark is embedded is color, both the digital watermark image and the image into which the watermark is embedded are converted into a RGB form, respectively, and the R, G, and B components of the digital watermark are embedded into the R, G, and B components of the image into which the watermark is embedded, respectively.